**Chapter 1 - Introduction**

1. What is Microprogramming?
2. What is the function of the control unit?
3. Basic IAS Structure, MAR/MBR
4. Wafers/Chips
5. Moore's Law
6. What is an embedded system?
7. What is cloud computing?
8. What is Internet of Things?

**Chapter 2 - Performance Issues**

1. Performance Balance
2. Wider vs Deeper memories
3. I/O Data Rates
4. Power and RC Delays
5. Amdahl's Law
6. (Ignore Little's Law)
7. AM, GM, HM

* Impact of performance evaluation

1. Benchmarks and their roles

**Chapter 3 - Buses**

1. Memory Read/Write cycles
2. Figure 3.5 (10th edition)– Example Program Execution
3. Classes of Interrupts
   * Soft, hard, timer, I/O
4. When is a check for an interrupt made?
5. How are multiple Interrupts handled?
6. Data Bus, Address Bus, Control Bus
7. Hierarchical Bus Configuration and elements of bus design
8. Arbitration - centralized and distributed
9. Synchronous and Asynchronous Buses
10. Multi-core QPI configuration (concepts here, not details)
11. PCI and PCI Express (concepts only, not details)

**Chapter 4 - Cache**

* Access/Cycle/Transfer time
* Sequential/Direct/Random Access
* Direct Mapping, Associative Mapping, Set Mapping
  + Be able to do problems about these
* Set-Associative
* Write Thru/Back
* Unified and Split Cache Decision
* Replacement Algorithms
  + LRU
  + FIFO
  + LFU
  + Random
* Victim Cache
* Hit Ratios
* Cost Analysis for Cache and Memory